Nested and chained Conditionals

Announcements
● Homework #1 due Thursday @ 11pm

Outline
● Warm-up
● Nested conditionals
● Chained conditionals
● Programming practice

Warm-up
For each of the following programs: (1) draw a flowchart and (2) specify what output the program will produce.

a. hour = 12
   if (hour == 12):
      print("noon")
   if (hour > 12):
      print("AM")
   else:
      print("PM")
Output:
noon
PM

b. cost = 200
   refund = 3
   if (cost > 100):
      refund = 10
   refund = refund * 2
   print(refund)
Output:
20

Recap: comparisons and order of operations
● Example program from last class:
   x = -2
   y = 0
   x > y == False
● Result is False; Why not True?
● If you have multiple comparisons without logical operators or parenthesis they are evaluated from right to left
● You can compare an integer and a boolean value --- True is equivalent to the integer value 1 and False is equivalent to the integer value 0
Nested conditionals

- The statements that are executed when a condition is true (or false) may include another if statement
  - Example
    
    ```
    print("This is always first")
    if x > 0:
        if y > 0:
            print("x is positive, y is positive")
        else:
            print("x is positive, y is negative")
    else:
        print("x is negative")
    print("This is always last")
    ```

  - Flowchart

- For each program: (1) draw a flowchart, and (2) indicate what the program will output.
  
  a. `a = 19`
     
     ```
     if a >= 50:
         print("Big")
     else:
         if (a < 10):
             print ("Small")
         else:
             print("Medium")
     ```
     
     Output:
     Medium
  
  b. `i = 11`
     
    ```
    j = 19
    if i > 5:
        if j > 15:
            print("A")
        else:
            if j > 15:
                print("B")
            if i > 10:
                print("C")
     ```
     
     Output:
     A
     C
Chained conditionals
- Multiple conditions that are checked in sequence
  - Example
    ```python
    if day <= 7:
        print("1st week")
    elif day > 7 and day <= 14:
        print("2nd week")
    else:
        print("Beyond")
    print("End")
    ```
  - Flowchart

- Re-write the programs from the previous problem to use chained conditionals
  a. Solution:
    ```python
    a = 19
    if a >= 50:
        print("Big")
    elif (a < 10):
        print ("Small")
    else:
        print("Medium")
    ```
  b. Solution:
    ```python
    i = 11
    j = 19
    if i > 5 and j > 15:
        print("A")
    elif j > 15:
        print("B")
    if i > 10:
        print("C")
    ```
Conditionals practice
For each of the following programs, which code blocks will be executed when the listed conditions are true?

a. if condition 1:
   code block A
   if condition 2:
   code block B
   elif condition 3:
   code block C
   else:
   code block D
When conditions 1 and 2 are True? A, B
When conditions 2 and 3 are True? B
When only condition 1 is True? A
b. if condition 1:
   code block A
   if condition 2:
   code block B
   elif condition 3:
   code block C
   else:
   code block D
When conditions 1 and 2 are True? A, B
When conditions 2 and 3 are True? D
When only condition 1 is True? A
c. if condition 1:
   code block A
   if condition 2:
   code block B
   else:
   code block C
   if condition 3:
   code block D
When conditions 1 and 2 are True? A, B
When conditions 2 and 3 are True? D
When only condition 1 is True? A, C

Programming practice
a. Write a program that asks for a year and outputs ‘Before’ or ‘After’ depending on whether the provided year comes before or after 2018.
b. Write a program that asks for yesterday’s and today’s high temperatures and outputs ‘Today is warmer’, ‘Today is colder’, or ‘Today is the same’.
c. Write a program that asks for a user’s first, middle, and last names and outputs which is the longest.
d. Write a program that asks for a username and password. If the input matches one of the combinations below, then the program should print ‘Login successful’; otherwise it should print ‘Access denied’.

<table>
<thead>
<tr>
<th>Username</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>alice</td>
<td>colgate</td>
</tr>
<tr>
<td>carlos</td>
<td>python</td>
</tr>
</tbody>
</table>